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ABSTRACT

A study was conducted to determine the patterns of questioning behaviors exhibited by four preservice and four inservice teachers in an inner-city elementary school. Specifically, the study examined the types of questions teachers asked, the types of responses given by students, the wait-time between questions that teachers provided for high- and low-ability reading groups, and the discussion time teachers provided high- and low-ability reading groups during pre- and post-story portions of reading comprehension lessons. The teachers were observed for six weeks, using the Question-Response-Interaction (QRI) instrument. Audiotapes of the pre- and post-story portions of the lessons also were collected for analyses. The results showed that both types of teachers tended to pose more textually explicit questions to the low-ability group. regardless of the story portion. The high-ability groups had more discussion time, received more textually implicit and raising type questions, and provided more supported responses. More wait-time between questions was accorded the high-ability group than the low-ability group, and more wait-time was given to pre-story portions than post-story portions of the reading lessons. There were minimal differences between preservice and inservice teachers regarding wait-time. (RL)

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A Study of Teacher Questioning and Student Response Interaction During Pre Story and Post Story Portions of Reading Comprehension Lessons

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A Study of Teacher Questioning and Student Response Interaction During Pre Story and Post Story Portions of Reading Comprehension Lessons

There has been much discussion regarding the questioning strategies of elementary teachers in reading classes. This paper will explore the literature and report the findings of a recent study which examined the types of questions, the types of responses given by the students, the wait-time between questions for high and low reading groups, and the discussion time provided during pre and post story portions of reading comprehension lessons of high and low reading groups.

In this descriptive study, the investigator examined the types of responses elicited from elementary school students and the types of questions elicited from in-service and pre-service teachers during pre story and post story portions of reading comprehension lessons. Solicitation patterns of student/teacher interactions were examined. If comprehension instruction was present, then the investigator expected open-ended or probing questions to be evidenced. If comprehension assessment was

present, then the investigator expected closed questions eliciting short, covert responses for the purpose of recall information. The investigator used a format suggested by Ruddell (1974) for the Question-Response Interaction (QRI) instrument. The categories of comprehension, (textually explicit, textually implicit and scriptally implicit) suggested by Pearson and Johnson (1978), were used.

An examination of the literature noted the need for the investigator to determine the types of student/teacher patterns taking place during the question-asking sessions of reading comprehension lessons. The cited research suggested that teachers' questions, while at times getting a response, rarely asked the students to explain or justify that response. The research also noted that teachers should build upon the child's background knowledge while using the strategy of questioning. The teacher's questions should, in effect, relate the child's background knowledge to the text. These types of interaction patterns are important if a child is expected to gain meaning from the text. By examining these interaction patterns, new information can be gained regarding the kinds of questions elicited from teachers and the kinds

of responses elicited from students.

Review of Literature

Durkin (1978), Gall (1972), Guszak (1966), Jenkinson (1969), noted that questioning by teachers was the most frequently used strategy as opposed to cloze, maze, and others. Durkin (1979) observed that teachers spent a great deal of time asking assessment type questions during the reading comprehension lesson. These questions required short responses. Thus, opportunities for student elaboration was limited. This has also been documented by the National Assessment of Educational Progress (1981) which noted that student responses to teacher questions were usually short. These student responses contained little, if any, justification or judgmental comments with supporting information.

Teacher Questioning Procedures. Durkin's (1978) study included the following three assumptions:

1. Reading comprehension can be taught.
2. Reading comprehension is being taught.
3. What is done to teach it is not as effective as comprehension instruction needs to be if reading problems are to be reduced (p.483).

Even though there were three assumptions, Durkin focused her study on the second one. She found reading comprehension instruction as comprehension assessment being taught in the classrooms observed. Specifically, she found that teachers spent 32.24% of their time on comprehension and of that time 17.65% was spent on comprehension assessment using questions (Durkin, 1978, p. 498). Questions by the teacher played an important role in developing the behaviors of students. When the teacher used questions and answers to extend the students' comprehension abilities, this was referred to as comprehension instruction (p. 490). However, if the questions and answers were used to assess the comprehension of the child, then this was referred to as comprehension assessment. Durkin (1978) noted that in comprehension assessment, wrong answers were not accepted but little was done to determine how the child arrived at the answer.

Durkin noted that the questions used by the teachers during the reading class were predominantly taken from basal reader manuals and were literal question types.

The amount of time spent preparing the children to read was 5.53 percent of a total 4,469 minutes. Thus,

a total of 247 observed minutes was utilized in preparing the children to read a given selection. No mention is made concerning the quality of the questions of pre story and if the questions are relative to the child's experience.

Gall (1972) noted that there had been very little change in the types of teacher questions (p. 15). He explained that researchers need to look at the complex relationships existing between questioning and responses. "Reading researchers need to become involved in this effort in order to discover relationships that are specifically applicable to reading instruction" (p.23).

Gall's research studied teacher questioning procedures and he discovered that

> ...about 60% of teacher's questions require students to recall facts; about 20% require students to think; and the remaining 20% are procedural (p. 15).

He further noted that;

> research on ...frequency (of questions) in reading classes of behavioral types would fill in a gap in our knowledge...researchers should also be concerned with the issues of

how teacher responds to students questions, and the role that these questions play in reading instruction (p. 18).

One of the most complete research studies done on questioning was by Guszak (1966). The purpose of his study was "...to describe teacher-pupil solicitations and response activity relative to reading content" (p. 129). The solicitation interaction was observed in grades two, four and six of top, middle and low reading groups. Guszak developed an assessment instrument which was an inventory of solicitations and response outcomes. He found that out of a total of 1,857 solicitations, 1,056 were recall in nature.

In regard to the groups, he found that the lower reading groups had a higher percentage of literal comprehension activity. "Literal comprehension solicitation activity tends to decline with advancing group levels in the fourth and sixth grades although such a pattern was not apparent in the second grade" (Guszak, 1966, p. 138). Guszak seems to recommend further examination of teacher-pupil solicitation response patterns, and an examination of teacher education of both pre and in-service teachers,

whereby, the role patterns that extend comprehension outcomes of students are noted (pp. 147-152).

In a later study Guszak (1969) further researched the questioning procedure used by teachers. He described one teacher's actions during the study as

1. The teacher answers the question herself.
2. The teacher classifies the question and tried again (keeping the same question open).
3. The teacher offers additional cues in hope of getting the desired response (1969, p. 113).

With other teachers, Guszak (1969) noted that 57 percent of the questions required simple recall. The teachers would intervene after asking the question by telling the student the correct answer or clarifying with new information. But for an incorrect response, the teacher did not add any information (p. 113).

Guszak (1969) described four question combinations that were developed during this study to relate the question to the responses. These were: Setting, Purpose or Follow-up, Verification, Justification, and Judgmental. The first combination described the

questions used to set up purpose for reading in the pre story portion of the lesson. These questions employed the children's experience as they prepared for the story. It also provided a category for the questions that were used during the follow-up portion of the post story reading lesson. The second question combination required the student to locate the answers directly from the text. The third combination required the student to justify explanations or conjectures. The last combination required the student to evaluate the response to the previous question. This last combination was nonexistant according to Guszak (1969).

In addition to describing teachers' actions and question combinations Guszak (1969) observed that teachers tend to:

a) emphasize recall thinking about reading,

b) utilize several controlling actions to cue, clarify, extend or shut off pupil thinking or answering, and

c) miss many opportunities for setting questions together into clusters that would extend thinking (p. 116).

Finally, Guszak (1969) offered the following

recommendations for teachers to use in assessing their question-answer procedures. First, teachers should set purpose for reading and see if the students achieve them; second, teachers should have students use flexible rate skills for verification of material; third, teachers should invite unsupported value judgments by students; and fourth; teachers should make better use of clustering questions (p. 116). Not only were Guszak's (1969) recommendations enlightening for teachers but he also cited suggestions that dealt with the kinds of thinking skills regarding questioning that they should develop. For example, teachers should: be conscious of the outcomes or responses they are initiating by their questions, use better judgment in determining the thinking abilities of students, and use discrimination in determining the values of selected basal text questions (p. 116).

Wait-Time for Student Responses. Rowe (1974) identified and clarified the term wait-time. Wait-time was designated as the pause between the time a teacher's question was terminated to the time a student's response was initiated (p. 86). Rowe found that the average wait-time was 0.9 seconds for all

students.

When teachers were asked to list the five highest students and the five lowest, Rowe noted a discrepancy between the wait-time of both groups. The students identified as 'highest' received at least two seconds to respond to a question whereas the identified lowest students received less than one second to respond.

Rowe's study raised a few questions for this investigator, namely: (1) How is the wait-time affected in homogeneous reading groups? (2) Do the types of questions solicited reflect a certain amount of wait-time? (3) Does the wait-time differ for pre story or post story portions of reading comprehension lessons?

Analysis of Student Responses. Jenkinson (1969) noted that teachers need to ask questions requiring greater depth and variety. One should not assume that comprehension has taken place because of a correct response. Jenkinson suggested that teachers examine the response errors made by students.

Evertson, Anderson, Anderson, & Brophy (1980) conducted a study with junior high mathematics teachers using process questions. They found that process questions had a direct and positive relationship to the

math achievement of their students. These process questions, which relied on the students' bank of information, required students to respond with explanations and justifications. Unfortunately, many of the teachers in the study used the product questions whereby only a correct or short answer response was acceptable. These product questions, although necessary, constituted the majority of questions asked by the junior high math teachers.

Centra and Potter (1980) suggested that the types of student responses were affected by the types of teacher questions. They concluded that this relationship had a positive bearing on the students' thinking abilities and that "...higher order skills (e.g. inferential reasoning are not particularly likely to be acquired (and certainly will not be demonstrated) by students whose teachers ask only lower order questions" (p. 285).

Methodology

Pilot Study. The purpose of the pilot study was to determine the feasibility of the Question Response Interaction (QRI) as an observational instrument. The pilot study enabled the investigator to revise and clarify the definitions of the various categories used

in the instrument. Reliability and validity was also established in this phase.

Description of the Question Response Interaction (QRI). The instrument used a format that was similar to the one recommended by Ruddell (1974). The form contained seven categories. These categories determined the question-answer interactions and the relationship that these interactions had on the textual material. The QRI did not show the continuous question-answer unit but recorded these question-answer units and the time span of each pre story and post story observed. The QRI, identified the following seven categories or cells:

the solicitor.....	teacher, child group
the solicitation.....	question, response, name, command question
the antecedent relationship.....	related, unrelated
questioning strategy categories.....	textually explicit
	textually implicit
	scriptally implicit
purpose of questions....	focusing
	extended
	clarifying
	raising

level of responses..... supported
unsupported
incorrect
misunderstanding

types of responses..... purpose
verification
justification
judgmental

Each category was identified by a code. The observer circled the appropriate code on the instrument. The circles were then connected and a pattern was recorded. These patterns were analyzed accordingly.

Subjects. The subjects were four volunteer in-service teachers and four pre-service teachers from an inner city elementary school in western Pennsylvania. The in-service teachers had at least three years of teaching experience and at least one reading methods course. The pre-service teachers were students attending the University of Pittsburgh and had been assigned to the elementary school for one term of student teaching experience. The pre-service teachers had completed one reading methods course and taught reading for four weeks during the previous term.

Setting. The setting was an open space elementary school in western Pennsylvania. The grade levels were arranged in pods. There were at least six classes per pod. The school was one of three magnet schools in the western Pennsylvania area. Magnet schools were schools that were designed to attract a diverse student population by employing innovative programs. The student, faculty, and staff populations were racially balanced.

Procedures

Observers. There were five trained observers all of whom were college graduates who majored in elementary education, and had teaching experience.

These observers participated in a one week training session. A training manual was provided. Various experiences using the QRI were included such as video taped and live segments of pre story and post story portions of reading lessons. These experiences permitted the observers to become familiar with the instrument and adapt to audio taping each portion.

Reliability. Four observers recorded the data. Inter-observer overall agreement was established at .89. Each category or cell was analyzed to determine the internal reliability. These coefficients are as follows:

CELL #	RELIABILITY
Cell One Solicitor (T,C,G)	1.00
Cell Two Solicitation (Q,R,CQ,N)	.98
Cell Three Antecedent Relationship (R,U)	.95
Cell Four Questioning Strategies (T*,C,E)	.84
Cell Five Types of Questions (F,E,C,R)	.76
Cell Six Level of Responses (S,N,I,M)	.90
Cell Seven Types of Responses (P,V,Jmt,Jst)	.84

Content validity. Four reading experts examined the content validity of the QRI. These examiners were certified reading supervisors each of whom had at least ten years of classroom teaching experience. The examiners agreed that the QRI measures what it is designed to measure.

Collection of data.

1. The observations were conducted for six consecutive weeks. All eight of the teachers were required to sign up for one pre story and post story observation for each high and low reading group.
2. The four pre-service teachers were assigned to grades three and five while the four in-service teachers were assigned to grades three and four.
3. The observer used stop watches to record the length of each pre and post story portion. The observers were required to secure a copy of the text beforehand. Each pre story and post story was audio taped. After the observation, the observers recorded the data by circling the appropriate code.

4. To avoid biasing the results during the study the observers did not provide any feedback to the teachers.

Analysis of data

The investigator listed patterns of interaction observed for each portion of the reading lesson. These were numerically listed and fed into the computer. Each group of interaction blocks were analyzed.

The amount of time spent during pre story and post story was recorded for pre-service and in-service teachers and high and low reading groups.

The wait-time was determined for each question by connecting the audio tape to an oscilloscope and noting the break in wave patterns. This break was the wait-time and a stop watch was used to determine its length for every question.

Discussion and Results. Although all two block to ten block interactions were examined, only the four block will be noted here.

Large frequencies for block interaction were observed (refer to Table 1). These interactions were in the form of teacher questions (TQ) and child responses (CR) with TQ-CR-CR-CR or TQ-CR-TQ-CR patterns noted.

There were 553 four block interactions observed.

The low group for pre and post story was asked more textually explicit questions than the high group (refer to Table 2). Pre-service and in-service teachers tended to pose more textually explicit questions to the low group regardless of the story portion. The high group received more textually implicit and raising type questions and solicited more supported responses. The reasons for this occurence could be due to (1) the abilities of the members of the group (2) the high expectations of the teachers for the group (3) the opportunities for the students to respond. The lack of supported responses by the low group could be due to (1) the students' inability to support statements (2) the teachers' conditioning of unsupported responses by students (3) the teachers' low expectations for the group.

Pre and Post Story Lengths. There was noted a three minute and eighteen second difference between the high group and low group during post story. This meant that the high group had a three minute advantage over the low group. The high groups had more discussion time. Unfortunately, the low group did not benefit from the

post story lengths (refer to Table 3).

Wait-Time. There was a minimal difference between pre-service and in-service teachers regarding wait-time (refer to Table 4).

The wait-time for the high group was higher than the low group. This result could be due to both groups of teachers spending less time on the low group because the low group should not waste any time in responding to the questions.

More wait-time was given to the pre-story portion than the post story portion. The low group's wait-time was lower regardless of pre or post story.

Summary

This study's findings have shown that the use of the Pearson and Johnson (1978) taxonomy with the Question-Response Interaction (QRI) concurs with the Guszak (1966) findings that more literal questions (textually explicit) are asked of the low reading groups. Durkin (1975) and Gall (1972) also described this high incidence of recall (literal or textually explicit) questions for low reading groups.

The Question-Response Interaction (QRI) findings

indicate that for the high reading group the longer the interaction block then the more textually implicit questions and supported responses were noted. For the low reading group, the findings indicate that the length of the interaction block did not affect the type or questions (which were textually explicit) or the types of responses (which were unsupported).

Most of the student responses were unsupported for the low reading group. This observation concurs with the studies of Browne (1971) and Centra & Potter (1980). When the questions were textually explicit then the responses would require short unsupported answers.

The discrepancy between the wait-time of the low reading group and the high reading group supported the Rowe (1974) study.

Limitations

This study was limited to an open classroom magnet school where only one basal series was used. The in-service and pre-service teachers in this study were in an inner-city elementary school. The pre-service teachers were from an inner-city university, but it is believed that the results would be similar for in-service and pre-service teachers in other elementary

schools.

Implications

The findings of this study have implications for teacher education in the area of questioning as comprehension instruction. This study showed that the percentage of textually explicit questions and the percentage of unsupported responses were used as a questioning strategy for comprehension assessment and not for comprehension instruction. In other words, there is a great deal of questioning for testing but little is done to instruct the student to comprehend.

Another inplication is that teachers need to be aware of the types of questions they ask and the types of responses they solicit from their students. It seems to this investigator that the students' responses were shown to be unsupported therefore, the types of questions asked did not elicit a supported student response.

Teachers need to be aware of the additional time given the high reading groups to answer questions and provide similar time periods for the low groups. It seems that teachers do not provide comprehension

instruction for their students, a concern verbalized by Durkin (1978, p. 490) and supported by this study.

Another implication was that in-service and pre-service training needs to be provided not only to extend questioning strategies of teachers but to educate them on student responses and wait-time for all of their reading groups. The QRI as an observation instrument was effective and provided data that concurred with the available research. This instrument could be helpful as an evaluative measure for teachers of reading. This instrument would provide teachers with data that could be entered verbatim on the QRI. The teachers could tape their lessons, record questions and responses on the QRI, and then circle the appropriate categories of questions and responses. This type of self-analysis of one's teaching procedures could be an important part of in-service education.

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TABLE 1

SUMMARY OF GENERAL INTERACTIONS

Interaction Block-Type	Frequency
2	522
3	135
4	553
5	135
6	417
7	169
8	245
9	84
10	194

TABLE 2.

GROUP FREQUENCY AND PERCENTAGE DATA FOR FOUR BLOCK INTERACTIONS

Group Type	Story Type	Scaling Group	X	N	T*	C	R	F	Ent	Cl	Ra	X'	N'	UP	UV	SV	Rd	Non Vert	No Res	S Jst	IP	IV	I Jst	S Jst	U Jst
In-Service	Pre	Low	TO	73	57.5	33.7	28.7	49.3	42.4	8.2		CR	56	48.4	11.6	33.	3.6	1.8			5.3				
			CO	-								GR	8	37.5											
In-Service	Pre	High	TO	43	36.0	37.2	27.9	53.5	37.2	9.3		TR	-												
			CO	2	50.0	50.0	-	-	-	100.0		CR	19	26.3	21.0	47.	5.2		62.5						
Pre-Service	Pre	Low	TO	90	72.2	11.1	16.6	52.2	27.7	20.0		GR	15	60.0	6.6		6.6								
			CO	1	-	-	100.0	-	-	100.0		TR	4	25.0		50.	25.0		26.6						
Pre-Service	Pre	High	TO	56	55.3	12.5	32.1	58.9	30.7	30.3		CR	87	16.1	48.2	28.	8.0	3.4	3.4						
			CO	5	60.0	-	40.0	40.0	-	60.0		GR	8	50.0	37.5				12.5						
Total	Pre	Low	TO	163	65.6	12.2	22.1	50.9	30.3	16.7		TR	2	100.0											
			CO	1	-	-	100.0	-	-	100.0		CR	50	30.0	38.0	14.	6.0	2.0	2.0	2.0	2.0	4.0		2.0	
Total	Pre	High	TO	99	46.5	23.2	30.3	56.5	22.2	21.2		GR	10	60.0	10.0			20.0				10.0			
			CO	7	57.1	14.3	28.5	29.5	-	71.4		TR	8	12.5	50.0	12.		25.0							
In-Service	Post	Low	TO	85	78.8	11.7	9.4	58.6	29.4	20.0		CR	145	27.5	33.1	26.	6.2	2.7	2.0			2.0			
			CO	2	100.0	-	-	-	-	100.0		GR	15	66.6	20.0				33.3						
In-Service	Post	High	TO	60	60.0	33.3	6.6	53.3	31.6	13.3	1.6	TR	2	100.0											
			CO	-								CR	78	25.6	29.5	32.	5.1	1.3	1.3	3.3	2.5		1.3	
Pre-Service	Post	Low	TO	73	42.4	24.6	32.8	54.8	27.4	17.8		GR	25	50.0	8.0		4.0	8.0	16.0			4.0			
			CO	3	33.0	-	66.6	33.3	-	66.6		TR	12	16.6	33.3	25.	8.3	16.6							
Pre-Service	Post	High	TO	74	33.8	41.9	24.3	55.4	39.1	4.0	1.3	CR	58	36.2	12.0	31.	32.0	3.4	30.7	1.7	3.4				
			CO	-								GR	26	57.6	3.8			7.7		100.0					
Total	Post	Low	TO	158	62.0	17.7	20.2	52.5	28.5	19.0		TR	-												
			CO	5	60.0	-	40.0	20.0	-	80.0		CR	52	17.3	36.5	32.	1.9		33.3	3.0	1.9	1.9		3.0	
Total	Post	High	TO	134	45.5	38.8	16.4	54.4	35.8	8.2	1.5	GR	35	66.6											
			CO	-								TR	1	100.0											
												CR	76	13.1	31.5	30.	1.3		3.9	13.1	1.3			5.2
												GR	5	80.0				20.0							
												TR	3	33.3		33.				33.3					
												CR	79	21.5	19.1	29.	3.8		2.5	20.2	3.8		3.8	
												GR	3	66.6					33.3						
												TR	3	100.0											
												CR	130	23.1	23.1	30.	5.9	1.5	2.2	8.3	2.2			3.0	
												GR	31	61.3	3.2			9.6	25.8	50.0					
												TR	4	25.0		25.				13.7	3.8	0.7			
												CR	133	19.8	23.6	30.	3.8		1.5				3.8		
												GR	27	77.7					22.2						
												TR	6	100.0											

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TABLE 3

Means of Pre and Post Story Lengths for the Combined Group of In-Service Teachers and Pre-Service Teachers

	N	Pre Story	N	Post Story	N	Total Mean
Low Group	21	16'20"*	22	14'17"	43	15'24"
High Group	17	16'19"	17	17'35"	34	16'53"
Total Mean	38	16'20"	39	15'53"	77	16'07"

* the ' indicates minutes

the " indicates seconds

TABLE 4

Means of Wait-Time for the Combined Group of In-Service Teachers and Pre-Service Teachers

Category	N	Mean (in seconds)
Combined Group	67	2.28"
Pre-Service Teachers	45	2.31"
In-Service Teachers	22	2.21"
Pre Story	36	2.50"
Post Story	31	2.02"
Low Group	33	2.13"
High Group	34	2.42"
Low Pre	18	2.40"
Low Post	19	1.80"
High Pre	14	2.60"
High Post	16	2.23"

TYPES OF QUESTIONS

Foc= Focus, initiates a discussion or is an attempt to refocus the discussion on a topic.

Ext= Extend, elicits additional information and elaboration on a topic.

Clar= Clarify, or explains information

Rais= Raise, solicits additional information at a higher level of comprehension than Ext.

TYPES OF RESPONSES

S= Supported response (either examples from the text, or evidence of support).

N= Unsupported response, an answer is used to suffice the question.

I= An incorrect response, the answer may be related to the question but the response is unacceptable, the incorrectness is on the child's part.

M= A misunderstanding by the student due to the "double interpretation" of the teacher's question. The incorrectness is on the teacher's part.

Purp= Employs the children's experience as they begin to read (pre story).

Ver= Verifies the answer directly from the text, or answers from experience.

Just= Justifies explanations or conjectures, answers why.

Judg= Evaluates or judges the response to the previous question, also makes value judgments about material.

Observer:_____ Duration:_____ Date:_____

Teacher:_____ Time:_____ Group Level:_____

Grade Level:_____ Post Story:_____ Pre Story:_____

Teacher Talk:_____ No Response:_____ Vocabulary:_____ Motivation:_____

Student Talk:_____

QUESTION-RESPONSE INTERACTION (QRI)

T C G	Q R CQ N	R* U*	T* C E	Q Foc Ext Clar Rais	R S N I M	Purp Ver Just Judg

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